

A NEW SPECIES OF *PUNTIUS* HAMILTON (PISCES: CYPRINIDAE) FROM KALAKAD MUNDANTHURAI TIGER RESERVE, TAMIL NADU, INDIA¹

(With three text-figures)

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Key words: Kalakad Mundanthurai Tiger Reserve, Tamiraparani river, Cyprinidae, *Puntius kannikattiensis* sp. nov.

Kalakad Mundanthurai Tiger Reserve (KMTR) is an important forest reserve for the origin of all the streams and rivers of the Tamiraparani system. Various streams and rivers of Tamiraparani river basin harbour several endangered and endemic fishes. Here we report a new species of the genus *Puntius* Hamilton from the Kannikatti region of KMTR. It was collected from the headwater streams of Tamiraparani river. *Puntius kannikattiensis* sp. nov. differs from the closely related species *Puntius fasciatus* in its morphometric characters and body colour pattern.

INTRODUCTION

Podigai hills, the core zone of Kalakad Mundanthurai Tiger Reserve (KMTR), have many streams and rivers, which form the major river Tamiraparani, a perennial east-flowing system in Tamil Nadu. The Tamiraparani has rich ichthyofauna, with a high degree of endemism. *Puntius arulius tambraparniei*, *Horlabiosa joshuai* (Silas 1953) and *Garra kalakadensis* (Rema Devi 1992) are endemic to this basin. Johnsingh and Vickram (1987) first documented the fish fauna of this sanctuary. About 70 species of fish, including several endangered large barbs like *Tor khudree*, *Hypselobarbus curmuca*, *H. kolus*, *H. dubius* and *H. dobsoni* are found in this region (Rema Devi *et al.* 1997, Arunachalam and Sankaranarayanan 1999). Because of its species richness and high degree of endemism, a detailed investigation on the fish habitats and ecological structure of fish assemblages in selected streams and rivers has been undertaken. As a part of the study, we collected good numbers of *Puntius* species from the different headwater streams of Tamiraparani

river in the Kannikatti region (above Karaiyar reservoir), amongst which on close examination we found a new species of *Puntius* Hamilton. It differs from the closely related *P. fasciatus* by several morphometric characters.

STUDY AREA

The Kannikatti region of KMTR is located west of Karaiyar reservoir (8° 35' 00"-8° 40' 30" N and 77° 15'-77° 25' E) in Tirunelveli district, Tamil Nadu (Fig. 1). It is an important core area for Project Tiger, and has thick and dense Moist Evergreen Forest. The eastern slope of this region is one of the important watershed areas, draining the perennial streams Ullar, Karaiyar, Kowthaliyar and Inchikuliyar. These tributaries join to form the major east-flowing river Tamiraparani. Inchikuli river and Ullar stream join to form the popular Banatheertham waterfall. The sampling site Ullar is located 5 km from the Banatheertham waterfall at 600 m above msl. It is a second order stream, with a maximum width of 10 m. The streambed comprises mainly of bedrock, large boulders and sand. There are 2 large pools and 3 riffles in a 100 m stretch. Water temperature was noted as 19 °C, and air temperature 21 °C. Both the river banks are occupied by deep, dense Semi-

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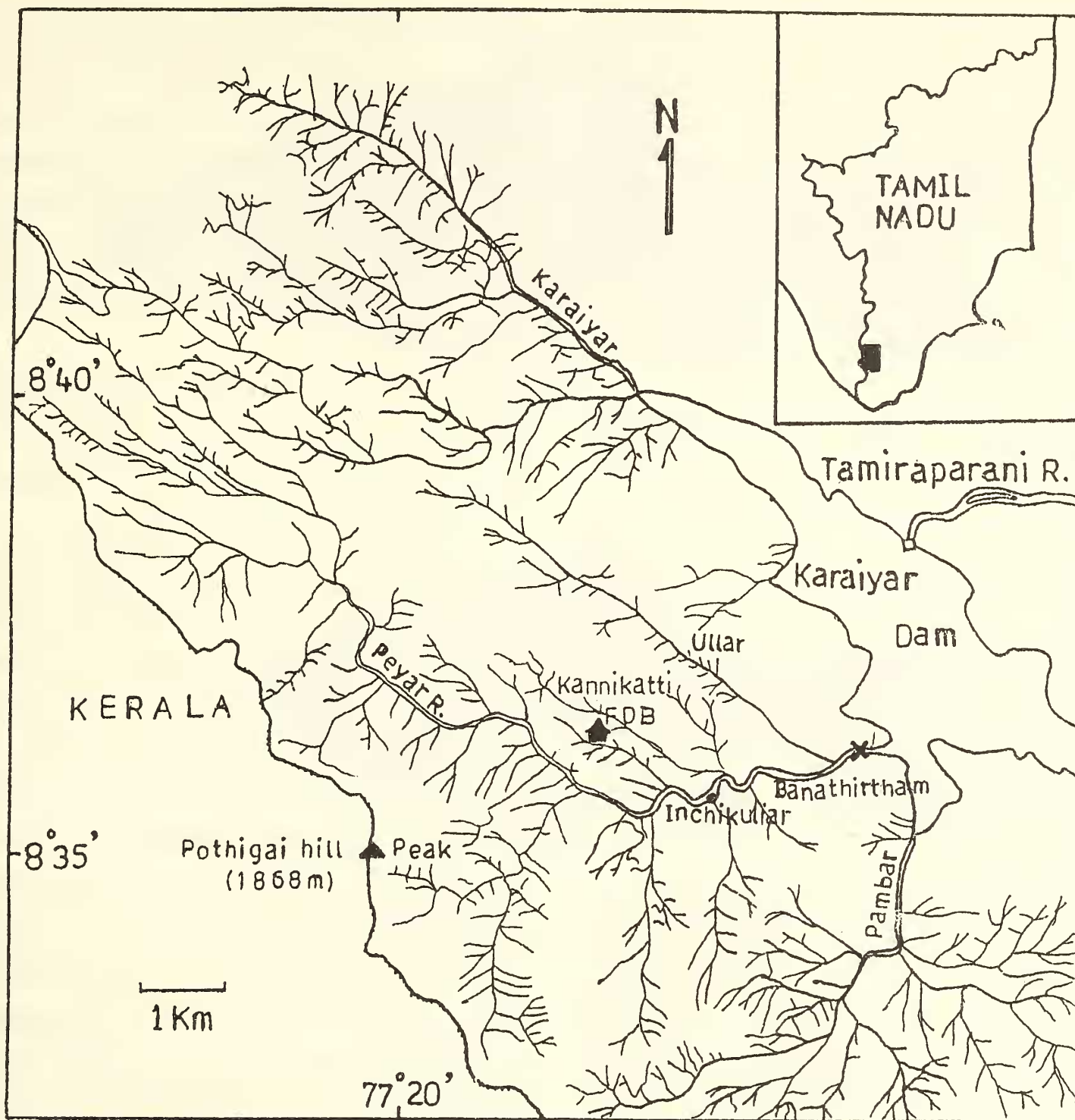


Fig. 1: Map of major streams/ rivers in Kannikatti region of Kalakad Mundanthurai Tiger Reserve

Evergreen Forest, mostly old growth of overstorey trees (60-80%), the overhanging vegetation provides cover (80%) to fishes. The new species described here is also recorded from other tributaries like Inchikuliar and Karaiyar of this region. *Puntius kannikattensis* sp. nov. is a bottom dwelling fish, mostly found in the slow flowing streams and backwaters of channels. It hides under boulders, cobblestones and leaf litter in the stream.

MATERIAL AND METHODS

Fishes were collected by monofilamentous gill nets (8 and 12 mm mesh size), drag net and scoop net. All counts and measurements were made from specimens preserved in 10% formaline. Hubbs & Lagler (1958) were followed for morphometric measurements. The examined material *P. fasciatus* was collected from the streams of Wynaad, Kerala (part of Nilgiri

Biosphere Reserve), Kallar river, Sangilipuzha stream and Achankoil river in the southern Kerala part of the Western Ghats. All were preserved and deposited in the Sri Paramakalyani Centre for Environmental Sciences (SPKCES), Manonmaniam Sundaranar University, Alwarkurichi, Tamil Nadu. ANOVA was performed to distinguish the two closely related species using morphometric characters and multiple comparison was performed using TUKEY Test.

Abbreviations: SL standard length; HL head length; ED eye diameter; IOW inter orbital width; sd standard deviation; ZSI/SRS Zoological Survey of India/Southern Regional Station.

Puntius kannikattiensis sp. nov.

Holotype: ZSI/SRS F. 6147, 52.0 mm SL, ex. Ullar, a tributary of Tamiraparani river, above Karaiyar reservoir, Kannikatti region (Kalakad Mundanthurai Tiger Reserve), Tirunelveli district, Tamil Nadu, India. Altitude 600 m, 80° 35' 30" N and 77° 20' 35" E, Coll. M. Arunachalam and J.A. Johnson, 5.viii.1998. Holotype was deposited in the Zoological Survey of India, Southern Regional Station, Chennai.

Paratypes: ZSI/SRS F. 6148, 2 examples, 51-53 mm SL; SPKCES F. 4 (19 ex., 35-60 mm SL) same locality as holotype and Inchikuliyar, Karaiyar streams of Tamiraparani river, Coll. M. Arunachalam and J.A. Johnson, 5.viii.1998.

Materials examined: 23 specimens, 31-45 mm SL of *P. fasciatus*, from streams of Wynaad (type locality 10.viii.1997), Kallar river (4.i.1998), Achankoil river (12.x.1997) and Sangilipuzha (5.i.1998) in the Kerala part of Western Ghats, Coll. M. Arunachalam and J.A. Johnson.

Diagnosis: *Puntius kannikattiensis* is a small species reaching 60 mm SL. It is distinguishable from the closely related species *P. fasciatus* by the insertion of the dorsal fin nearer to caudal fin base than to tip of snout (vs. midway between tip of snout and caudal fin base in *P. fasciatus*), in having

smaller eye (eye diameter 23.3-28.6% HL, vs. 29.0 - 33.3 %) and having little space between vent to origin of anal fin (vs. no space in *P. fasciatus*). It also differs from *P. fasciatus* in its body colour and markings. In adults, the entire body is blackish-brown; the juvenile has two black blotches, one below the dorsal fin and one oval blotch at caudal peduncle (blotches indistinct in adults) vs. pale yellow colour body with three black vertical bars in *P. fasciatus*.

Description: The general body shape and appearance are shown in Fig. 2. Morphometric data from holotype and paratypes of *P. kannikattiensis*, *P. fasciatus* and the statistical analysis are given in Tables 1 & 2.

Head and body compressed laterally, dorsal steeply arched and belly slightly rounded. Eyes placed dorsolaterally, visible from both dorsal and ventral aspects. Snout conical and nares placed closer to the eyes than to tip of the snout. Mouth inferior, arched, and lips fleshy, continuous at angle. Barbels two pairs, maxillary: first pair long, nearly twice the eye diameter. Dorsal fin origins above 7th scale of lateral line, inserted closer to caudal fin base than to tip of snout, with 2 simple and 8 branched rays, the last one branched to the base. Pectoral fin with 1 simple and 11 to 13 branched rays, and not reaching the pelvic fin. Pelvic fin originates just opposite the origin of dorsal fin, with 1 simple and 7 branched rays. Anal fin originates a little after the vent, with 2 simple and 5 branched rays, last one branched to the base. Caudal fin forked, with 9+8 branched rays. Lateral line complete with 20-22 scales. Predorsal scales 7, preanal scales 16 and circumpeduncular scales 12. Transverse scale count between lateral line to dorsal fin origin and pelvic fin origin is $\frac{1}{2} 3 + 1 + 2 \frac{1}{2}$.

Coloration: Live specimens are blackish-brown overall. Head and dorsal up to lateral line deep black. Ventral side brown. Body with two black round blotches: one below the dorsal fin extends just above the lateral line, another oval-shaped blotch at 14-16th lateral line scale of

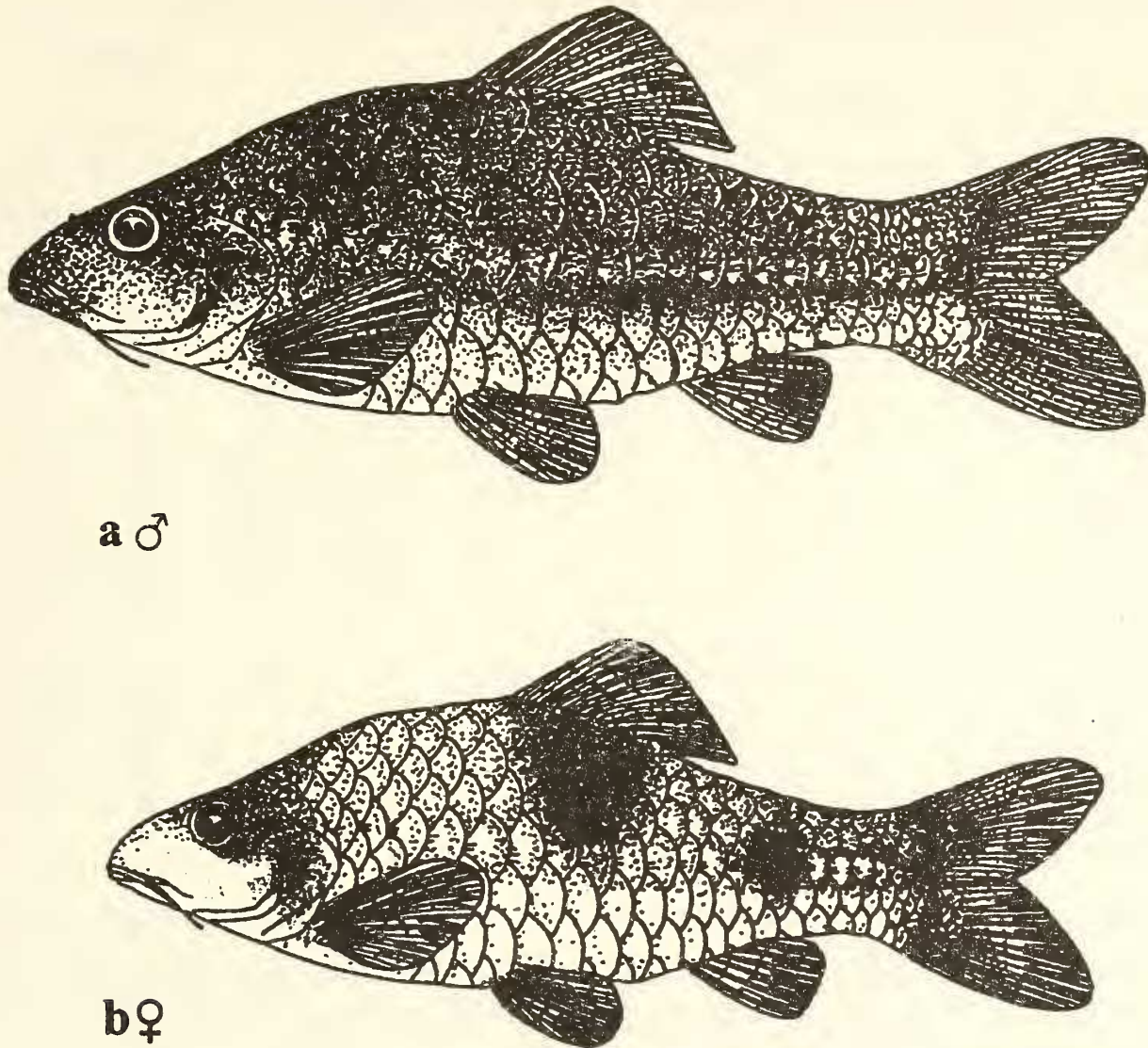


Fig. 2: Lateral view of a) *Puntius kannikattiensis*, 54 mm SL, Male, b) *P. kannikattiensis*, 47 mm SL, Female

caudal peduncle (more distinct in smaller specimens). Eyes deep red, all fins black. Preserved specimens in formalin: dorsal and lateral portion dark brown, ventral portion light brown, black blotches not clear (Fig. 2).

Sexual dimorphism: Males deep black, tubercles on front of snout, and extended laterally below the eyes, also on the lower jaw. Black blotches on the body not clear. Fins and lips deep black. In females: snout plain, no tubercles on snout or lower jaw. Lips white, fins pale yellow to dull white; entire body blackish-brown, blotches distinct.

Distribution: Ullar stream, Karaiyar stream and Inchikuli river of Tamiraparani, Kannikatti region, Kalakad Mundanthurai Tiger Reserve, Tirunelveli district, Tamil Nadu.

Etymology: The species is named after the type locality Kannikatti Reserve Forest region, Kalakad Mundanthurai Tiger Reserve, Tirunelveli district, Tamil Nadu.

DISCUSSION

Puntius kannikattiensis sp. nov. differs from all *Puntius* species known so far. However, it is closely related to *Puntius arulius* and *P. fasciatus* (Jayaram 1999). There are more differences than similarities between these two species. *Puntius arulius* has a single pair of maxillary barbels (Silas 1953) while *P. kannikattiensis* has 2 pairs. It differs from *P. fasciatus* recorded from various streams in the Kerala part of Western Ghats in having smaller

Table 1: Morphometric measurements of *Puntius kannikattiensis* (Holotypes and paratypes) and *P. fasciatus*

Characters	<i>P. kannikattiensis</i>					<i>P. fasciatus</i>			
	Holotype	Paratypes n = 23				n = 23			
		Min.	Max.	Mean	s.d.	Min.	Max.	Mean	s.d.
% of Standard length									
Body width	39.3	34.5	42	38.71	1.95	32.4	37.8	36.07	1.23
Body depth	21.5	20.5	28.5	23.42	2.49	18.7	21.1	19.83	0.67
Head length	27.8	27.8	34.2	29.49	1.50	25.8	30.7	28.36	1.12
Predorsal Length	52.3	52.3	58.5	55.15	1.49	48.2	58.5	51.28	2.16
Length of caudal peduncle	14.8	13.5	18.2	15.66	1.52	16	18.9	17.55	0.80
Length of anal fin	19.6	15.7	19.6	17.29	1.52	17.25	21.4	18.86	1.05
Length of pelvic fin	19.6	16.6	21.0	18.87	1.12	18.9	21.6	20.12	0.78
Length of pectoral fin	21.6	18.2	25.0	20.2	1.65	20.2	22.8	21.54	0.82
Snout length	8.2	7	11.4	9.23	1.50	9.2	113.3	10.79	0.93
Eye diameter	8.0	7	8.6	7.63	0.46	8	9.4	8.48	0.36
% of head length									
Eye diameter	23.5	23.3	28.6	26.04	1.64	20	33.3	30.39	2.51
Snout length	29.4	25	39.3	31.31	4.94	35.2	42.8	38.7	2.32
Length of pectoral fin	70.6	62.5	78.6	70.73	3.67	70	80.9	75.21	3.07
Eye diameter/inter orbit width	71.4	58.3	75	67.89	5.02	62.5	80	70.31	6.37
Ht. Caudal peduncle/ Length of caudal peduncle	95.0	80	100	92.25	7.57	80	100	91.46	4.97

eye (25.9% HL vs. 30.8%) with less IOW (67.8% ED vs. 76.6) and larger body scales. The more distinct character is the insertion of dorsal fin closer to caudal fin base than to tip of the snout.

Table 2: Multiple comparison of characters by one-way Anova and mean values by Tukey Test (* = p<0.5)

Characters	Anova F-value	Tukey Test
Body width / SL	29.48	*
Body depth / SL	44.38	*
Head length	7.94	n.s
Predorsal Length / SL	47.14	*
Length of caudal peduncle / SL	27.42	*
Length of anal fin / SL	22.32	n.s
Length of pelvic fin / SL	18.57	n.s
Length of pectoral fin / SL	11.89	n.s
Snout length / SL	17.55	n.s
Eye diameter / SL	46.89	*
Eye diameter / HL	45.32	*
Snout length / HL	43.66	*
Length of pectoral fin / HL	19.44	n.s
Eye diameter / Inter orbit width	1.94	n.s
Ht. Caudal peduncle/ Length of caudal peduncle	0.17	n.s

n.s = not significant

In *P. fasciatus*, the body bears 3 vertical black bars: the middle one is broad and extends to the ventral surface. In *P. kannikattiensis* there are two black blotches, one below the dorsal fin extended above the lateral line, and the other oval, at the caudal peduncle (more distinct in juveniles), vs. three black bars in *P. fasciatus*. Additionally, *P. kannikattiensis* has the largest size scales with broad focus region formed of number of radiating striae and more number of incomplete lateral striae (Fig. 3) vs. small scales, simple focus area without radiating striae (few radiating striae are found in scales from caudal peduncle region) and less number of complete lateral striae in *P. fasciatus*. Based on ANOVA, almost all the morphometric characters show differences except i) eye diameter/interorbital width and ii) height of caudal peduncle/length of caudal peduncle in *P. kannikattiensis* and *P. fasciatus*. Also significant results from Tukey test show that the two species are distinct for characters such as body depth, width, predorsal length, caudal peduncle length, eye diameter and

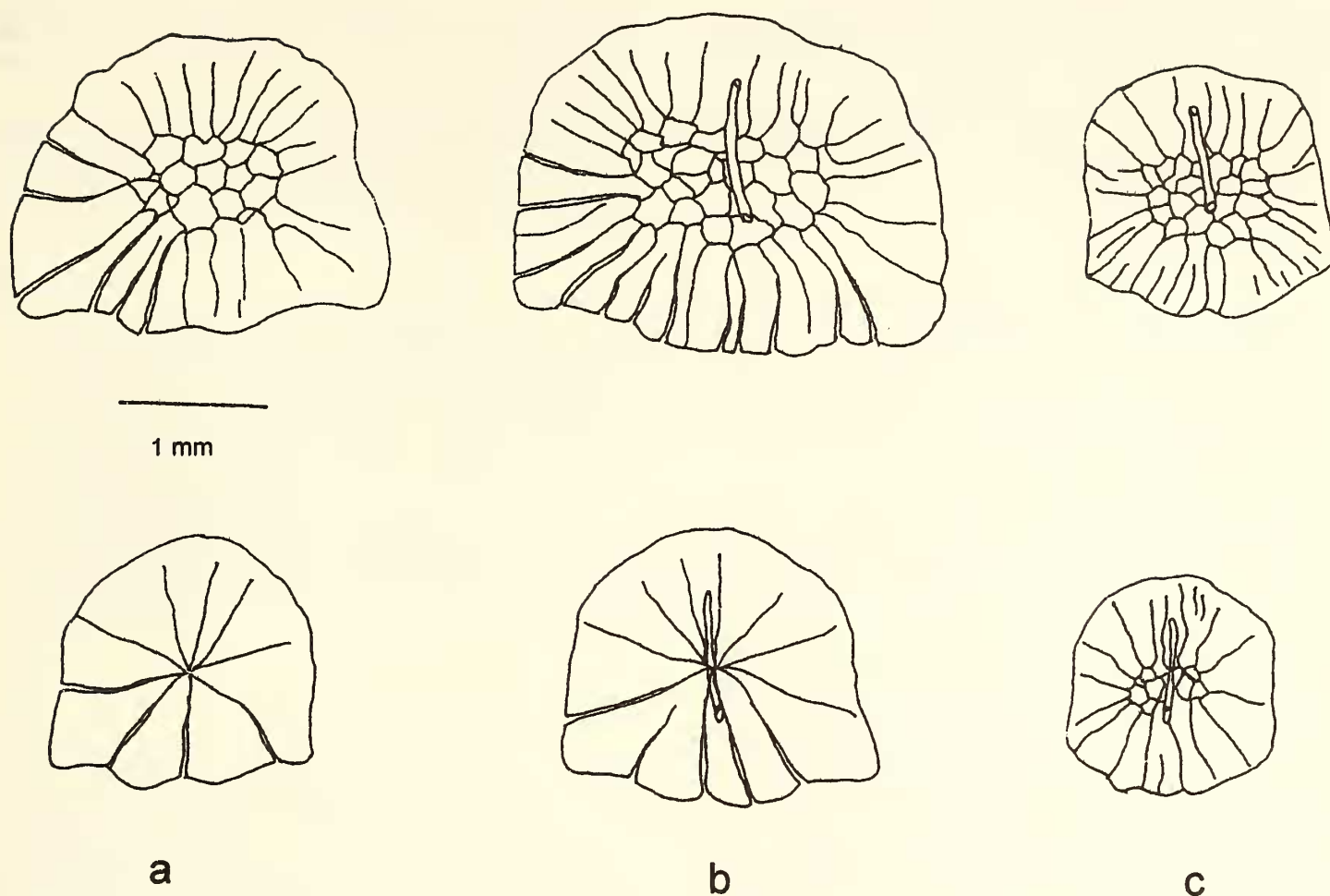


Fig. 3: a) Scales from behind opercule, b) Lateral line, c) caudal peduncle, *Puntius kannikattiensis* (above) and *P. fasciatus* (below)

snout length/SL and eye diameter and snout length/HL. The distribution of *P. fasciatus* is restricted mainly to west flowing streams/ rivers of Kerala (except the east flowing ones of Nilgiri Biosphere Reserve, Jayaram 1991, 1999). Therefore the occurrence of this new species from an east flowing river of southern Tamil Nadu is of special interest.

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